

REEFS OF BIKINI, MARSHALL ISLANDS

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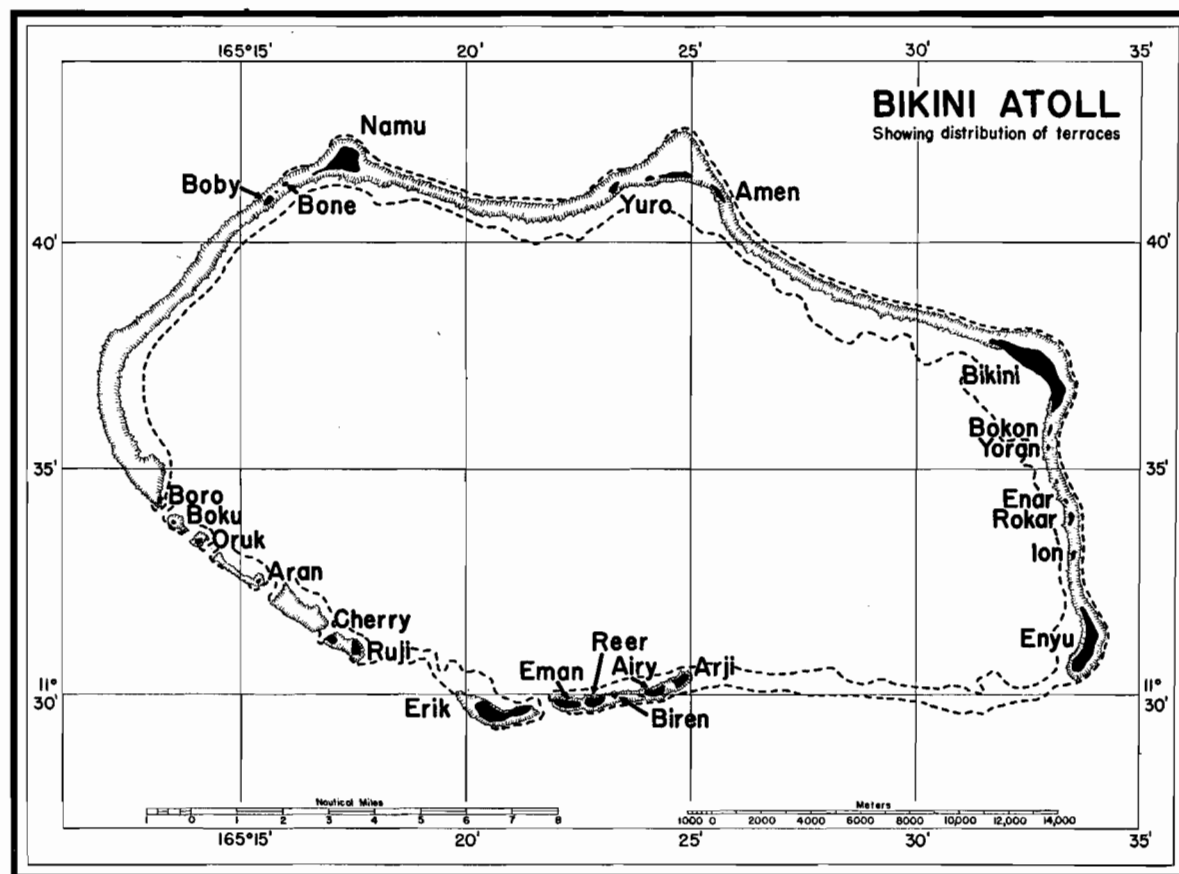


FIGURE 1.—Sketch map showing the distribution of terrace inside lagoon and outside reef

Seaward terrace generalized to include all areas with a gentle offshore slope. Terrace shown by heavy dashed line. Outline of reefs and islands from H. O. 6032.

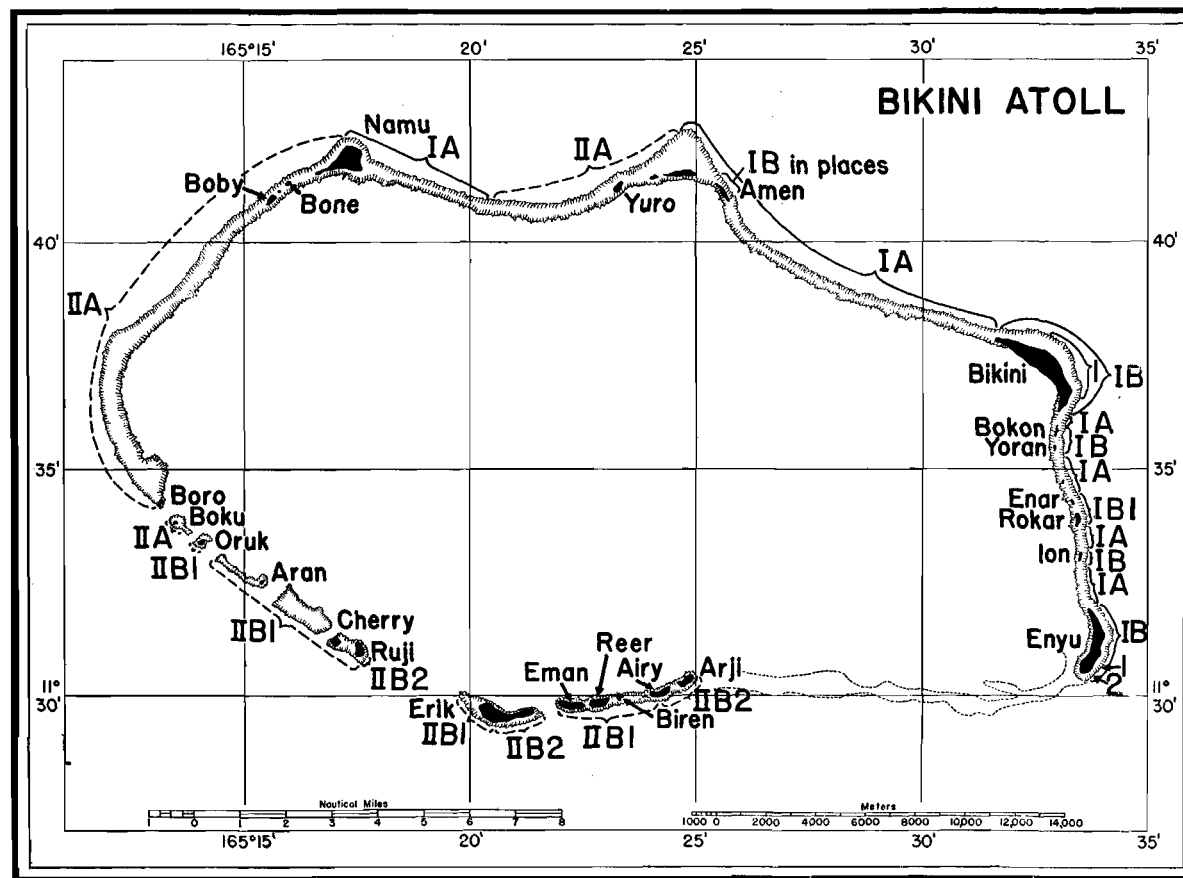


FIGURE 3—Sketch map showing the distribution of main reef types
Refer to Key (text). Outline from H. O. 6032.

Being in direct contact with the open sea it receives a constant supply of water rich in food and nutrient salts. It supports the greatest concentration of living organisms and to a large extent it controls the environments of the reef zones that lie behind it. The character of the marginal zone and the nature of the assemblages of organisms that live on it are in turn dependent upon the characteristics of the submarine slope upon which it stands, its relation to the prevailing waves and currents, and other ecological factors. The distribution of the various reef types is shown in Figure 3.

	<i>Occurrence</i>
I. Strongly grooved	Wave—windward side
A. <i>Lithothamnion</i> ridge low, uncut by the grooves.	Areas between islands concave seaward
B. <i>Lithothamnion</i> ridge prominent, cut by grooves that form surge channels.	Areas, especially off islands, convex seaward
(1) Ridge formed by columnar bosses separated by intersecting surge channels, roofed over locally to form room-and-pillar structure.	Northeast reef off Bikini Island
(2) Ridge formed of elongate buttresses separated by narrow surge channels roofed over to landward, and terminating in algal mounds and blowholes.	Southeast reef off Enyu Island; southeast and south-southeast reefs, Eniwetok
II. Grooves weak or absent	Leeward side
A. Reef margin smoothly scalloped.	West side Bikini
B. Reef margin made irregular by erosion.	Southern reefs
(1) Re-entrants large and irregular.	South-southwest reefs
(2) Re-entrants long, narrow, subequal in size.	South-southeast reefs

DISTINCTIVE FEATURES

TYPE I. *Strongly grooved.* The seaward slopes of this type of reef are cut by well-developed grooves normal to the reef front 50–300 feet long, 3–10 feet wide, and 6–25 feet deep. The grooves are relatively straight but in some places are forked, usually downslope (Pl. 9, fig. 1). The spurs separating the grooves are flattened algal ridges 25–50 feet or more in width. The tops of the ridges are covered by living algae, and the sides also appear to be algal, but there is no evidence that the algae are roofing over or otherwise filling the grooves. The floors of the grooves are flattened and appear to be composed of algal limestone covered in some places by a veneer of sand, gravel, or boulders. In areas where a terrace extends seaward beyond the ends of the spurs the floors of the grooves appear to be a landward continuation of the terrace whose seaward-sloping surface is gently convex upward. So far as is known, the grooves do not extend seaward beyond a depth of 50 feet.

Reefs of this type are best developed on the windward side of the atoll. They are characterized by well-developed algal growth that appears to be adjusted to strong steady surf. The waves remove much material from the reef in small pieces which are transported down the grooves and down the terrace. Eroded parts of the reef are healed by organic growth, and the reef appears in near equilibrium. Since they are adjusted to strong surf, major storms have little additional effect.

TYPE I-A. *Lithothamnion* ridge low. The marginal ridge is a broad arch, sloping